UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/528,889	03/20/2000	Gregory N. Hullender	1204	5627

7590 03/11/2003

LAW OFFICES OF ALBERT S. MICHALIK, PLLC
704-228TH AVENUE NE
SUITE 193
SAMMAMISH, WA 98074

EXAMINER
MILLER, MARTIN E

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/528,889	HULLENDER ET AL.	
	Examiner	Art Unit	
	Martin Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE filed 1-3-03* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 28, 2002 has been entered.

Response to Arguments and Amendment

2. In making his Arguments, filed 10/28/2002, p. 8, ll. 7-8, that the primary recognizer of the instant application "simply outputs a shape index, while specifically *not* making any such ambiguity-related decisions or actions" [emphasis in the original], Applicant's representative has failed to acknowledge how the primary recognizer of the instant invention is trained.

The specification states, "In accordance with one aspect of the present invention, as described in more detail below, those chirographs which often confuse a recognizer are provided to a secondary recognition process"[emphasis added]. Specification, p. 6, ll. 11-14. Applicant's specification goes on to state, "Note that such often-confused chirographs are not limited to sets of two, but are often confused with two or more other chirographs." Specification, p. 7, ll. 4-6.

Additionally it states, "In an alternative, embodiment, the primary recognizer can be trained to recognize shape classes that represent code points (or subsets of code points) that look alike" [emphasis added]. Specification, p. 7, ll. 7-9. For additional support see, page 9, lines 20-23, and page 21, lines 13-16.

Furthermore, in figure 11 and its associated description on pages 22 and 23 of the specification, Applicant in element 1104 of figure 11 shows a DECISION block as to whether the code point has an associated Cart Tree (secondary recognizer and the specification states, "the code point 82 is used (by a lookup process 84 or the like) to determine if the code point has a CART tree associated therewith." Specification p. 22, l. 25-p. 23, l. 2. It appears that giving the DECISION block of figure 11 and the associated text, its plain meaning that the present invention does use some form of decision-making process after the recognition of the input chirograph is classified. However, Applicant pursues the argument that a primary recognizer's recognition process is separate from the decision to associate a secondary recognizer to the recognition result. However, if applicant looks at Pintsov's figure 5, they will see that the decision is separate also. In block 100, the universal classifier generates a probable character, then in block 102, a decision is made (as is made in the instant application's figure 11, block 1104) whether the character is suspicious, which can be based upon a number of "criteria such as apparent size, type of character, level of gray in the image of the character, styles of handwriting,..., upon assignment of a character candidate." Col. 3, ll. 53-57.

All of the above indicate that the primary recognizer does make such ambiguity-related decisions or perform ambiguity-related actions.

3. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the

applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

This alleged hindsight results from the applicant attempting to characterize the instant invention as "a primary recognizer that does not have to be specifically coded to recognize chirographs that belong to confusion sets, followed by independent secondary recognizers, as essentially claimed by the applicants". Arguments filed 10/28/2002, p. 10, ll. 1-4. This may be a correct statement if the specification lacked such contrary statements regarding confusion sets as listed above. See Specification, p. 6, ll. 11-14, p. 7, ll. 7-9, p. 9, lines 20-23, and p. 21, lines 13-16.

Applicant states that the examiner used impermissible hindsight to come to the conclusion that the universal classifier of Pintsov has a primary classification step and then a decision step to decide to call the specialist classifier, however, Pintsov figure 5 clearly shows that the character is first recognized and then the result is used to decide to call the specialist based on the suspicion criteria used (col. 3, ll. 53-57).

4. Applicant also argues that the primary recognizer does not need to be "programmed" as required by the prior art systems as stated on page 8 of the arguments filed 10/28/2002 quoting page 2, lines 1-14 of the Specification. However, no such limitations appear in the claims. Since the present invention is computer based, how are associations between primary and secondary recognizers made? Are any programming steps required to make that association?

5. With respect to claim 14, Applicant argues that it is illogical that Pintsov would use an ASCII value to call the specialist classifier, and nonsensical that Pintsov would recognize an ASCII character. If the examiner had said that, he would agree, but the examiner said, " the

output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, 11. 47-49 or col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.)". Nowhere in that statement is an allegation that Pintsov recognizes an ASCII character. In order to clarify the above statement, Applicant's attention is directed to Pintsov col. 3, ll. 47-49, which states, "Any particular specialist classifier 9 is selected based upon the probable identity of a candidate character, as determined by the universal classifier system 8,", so some recognition value, which typically is in ASCII form as taught by Pintsov, is used to identify the specialist classifier that should be called. Pintsov then teaches, "The "called" specialist classifier 9 analyzes the image data by performing a recognition algorithm tailored to the candidate character and then out puts a probable character code 6.", which clearly teaches that the character image data is input into the specialist classifier. With regard to the Applicant's allegation that Examiner's statements are illogical, applicant merely has to look at claim 13 to see the same logic as the Examiner's, the limitation of claim 13 states "a selection mechanism that selects a selected secondary recognizer based on the shape index; and the selected, secondary recognizer determining a recognition result from the chirograph and returning the recognition result." Shape index is a value not image data, just like ASCII, that is used to identify a particular secondary recognizer.

6. Applicant also argues that the GUO reference teaches away from the claimed invention because it recites, "it is a 10 class problem to recognize the numbers 0-9" and that GUO concludes that his "CTNNFE" is superior to other methods. Applicant's arguments, p. 15.

Examiner fails to see how the two cited references state that GUO cannot be incorporated as specialist classifier into the system of Pintsov. When it is that superiority is exactly why the examiner is relying on GUO to teach that CART trees are particularly appropriate as the specialist classifiers in Pintsov. Pintsov states "The specialist classifier may be implemented in any desired fashion, using, for example, feature extraction algorithms such as neural networks, and syntactic and linguistic algorithms, "nearest neighbor" algorithms, and other algorithms known in the art of character recognition." col. 3, ll. 26-30. GUO's narrowly focused algorithm is particularly suited for incorporation into Pintsov's system because he desires the full power of such methods to bear on specific ambiguity class. col. 3, ll. 29-35.

7. After further consideration and review, the applicant's arguments and amendment do not overcome the rejection of record. The examiner agreed in a telephone interview that the cited passages of Pintsov do teach the universal classifier making a decision contrary to the requirements of the amended independent claims; however, a more careful review of Pintsov reveals that such a decision process can be eliminated by a pre-programming step.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 7, 13 and 18 with respect to the primary

recognizer recite the limitation, "without making any decision as to whether that chirograph is of a set of easily confused chirographs". However, as pointed out above, the primary recognizer is trained to distinguish between confusion pairs. The specification states, "In accordance with one aspect of the present invention, as described in more detail below, those chirographs which often confuse a recognizer are provided to a secondary recognition process"[emphasis added]. Specification, p. 6, ll. 11-14. Applicant's specification goes on to state, "Note that such often-confused chirographs are not limited to sets of two, but are often confused with two or more other chirographs." Specification, p. 7, ll. 4-6.

Additionally it states, "In an alternative, embodiment, the primary recognizer can be trained to recognize shape classes that represent code points (or subsets of code points) that look alike" [emphasis added]. Specification, p. 7, ll. 7-9. For additional support see, page 9, lines 20-23, and page 21, lines 13-16.

Furthermore, in figure 11 and its associated description on pages 22 and 23 of the specification, Applicant in element 1104 of figure 11 shows a DECISION block as to whether the code point has an associated Cart Tree (secondary recognizer and the specification states, "the code point 82 is used (by a lookup process 84 or the like) to determine if the code point has a CART tree associated therewith." Specification p. 22, l. 25-p. 23, l. 2.

Additionally, figure 11 of the instant application clearly shows a DECISION block. Since the primary recognizer is trained on characters that tend to confuse recognizers, the primary recognizer does in fact make decisions based upon whether the chirograph is of a set of easily confused characters.

Claims 2-6, 8-12, 14-17 and 19-27 are rejected for their dependency upon rejected claims 1, 7, 13 and 18.

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 1, 2, 7, 8, 12, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov, US 5881172.

As per claim 1, Pintsov teaches:

providing a primary recognizer (universal classifier system, abstract, col. 2, 11. 7-34, col. 20, 11. 28-54) for converting chirographs (col. 2, 1. 21, "styles of handwriting" and col. 2, ll. 34-35) to shape indexes; applicant states in his arguments that the out put of the primary recognizer could be "in the form of a shape index , such as a code point" (pg. 11 of amendment entered into the file September 20, 2001), Pintsov's universal classifier outputs "machine-readable data, typically in ASCII form', col. 1, Il. 47-49. Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.

providing a plurality of secondary recognizers ("specialist classifiers", col. 3, 11. 16-18) to convert chirographs into code points (col. 4, 11. 10-14), and associating the secondary recognizers with at least some of the shape indexes ("ambiguity classes", col. 3, 11. 18-21),

receiving a chirograph (col. 1, 11. 10-11, "automated recognition of . . . handwritten characters").

providing a chirograph to a primary recognizer and receiving a shape index therefrom (col. 3, 11. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.), the primary recognizer providing the shape index without making any decision as to whether that chirograph is of a set of easily confused chirographs (col. 4, ll. 4-10, Pintsov teaches that the universal classifier system (figure 5, block 100) can always be pre-programmed to recognize that a character is suspicious (figure 5, block 102) based on the listed suspicion criteria and then select a specialist classifier (figure 5, block 106).

Pintsov does not teach, other than using the recognition result of the universal classifier (primary recognizer) to select the specialist classifier (secondary recognizer), that the specialist classifier without further decision by the primary recognizer. Pintsov discloses that the universal classifier "calls" the specialist classifier. By using quotes it is ambiguous as to whether Pintsov system does a specific call to the classifier or based upon the output of the universal classifier another portion of the system makes the call. But such a determination is well within the ordinary skill of one in the art to call the specialist classifier based on commands executed in the universal classifier or a part of the system that receives the output from the universal classifer and calls the specialist classifier. Additionally since Pintsov teaches that the selection is based upon the probable identity of the candidate character, the universal classifier has already made a decision on the character.

determining whether one of the secondary recognizers is associated with the shape index ("Any particular specialist classifier is selected based upon the probable identity of a candidate

character... and whether the candidate character is 'suspicious"'.), and if so, selecting that secondary recognizer as a selected secondary recognizer. Furthermore, in discussing figure 5, Pintsov states that one or more universal classifiers are applied to the image data to generate a probable character, and then a determination is made to call the universal classifier (col. 3, l. 65-col. 4, ll. 22). Having possibly conflicting reports from each universal classifier as to call or not call seems to not be what Pintsov is teaching, Pintsov appears to be teaching that a determination is made to call a specialist classifier only after the character is recognized and determined to be part of the suspicious class of characters.

It would have been obvious to one of ordinary skill in the art to use either the universal recognizer to call the specialist classifier or merely output a recognition result and another part of the system call the specialist classifier. Such decisions are made to take advantage of processing efficiencies of the host computer systems and also to bring to bear the full power of various feature extraction algorithms to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, col. 3, ll. 30-35).

As per claims 7, 20 and 23, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply.

As per claim 21, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claims 2, and 8, they recite identical limitations and, therefore, the following remarks apply to each.

Pintsov teaches:

shape index comprises a code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, 11. 47-49, or col. 3, 11. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.)

As per claim 12, Pintov teaches:

wherein the recognition result comprises a code point. (col. 1, 11. 47-48).

Claims 19 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to claims 1 and 7, further in view of Shimizu et al. (hereinafter Shimizu, US 6038343).

As per claims 19 and 22, Pintsov teaches that his specialist classifiers are called when a character is determined to be suspicious (col. 4, l. 10-22). However, Shimizu teaches:

wherein each shape index that the primary recognizer (fig. 1, element 11) is capable of outputting has a unique secondary recognizer (fig. 1, element 17) associated therewith.

It would have been obvious to one of ordinary skill in the art to use the writer specific feature vectors of Shimizu to augment the system of Pintsov to increase the ratio of a character recognition system employing a universal recognition dictionary without requiring that special operations be performed before character recognition is performed on the handwriting of a new writer (Simizu, col. 2, ll. 17-22, col. 3, ll. 1-6).

11. Claims 13-15, 17, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to claims 1 and 7, further in view of Crane, US 4,531,231.

As per claim 13, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply. Claim 13 does have two different limitation that requires further explanation. Pintsov teaches that his recognition system can be used for automated recognition of handwritten characters (col. 1, 11. 10-11), but he does not specifically state an interface means for accepting a handwritten character data. Pintsov teaches accepting image data from some device (see figure 4, element 3). The claim recites that the use of an "interface configured to receive a chirograph", Crane teaches an interface (see figs. 1 elements 12 and 14). It would have been obvious to one of ordinary skill in the art to utilize the handwriting input means of Crane in the system of Pintsov to provide a registration means so that Pintsov could accept handwritten characters so that Pintsov could utilize his method of automated handwriting recognition. Additionally, the Crane reference is used to illustrate that such an interface feature is well-known in the art of computer-based handwriting recognition.

The second limitation is partially addressed by the comments with respect to a similar limitation in claim 1 however, the selection mechanism in not completely disclosed, however, Pintsov teaches:

a selection mechanism that selects a selected secondary recognizer based on the shape index, without further decision by the primary recognizer (col. 3, l. 65-col. 4, l. 22).

As per claim 14, Pintsov teaches:

shape index comprises a single code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, 11. 47-49 or col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it

inherently follows that the value passed to the specialist recognizer would also be in ASCII form.).

As per claim 15, Pintsov teaches:

wherein the shape index comprises a single code point that differs from the returned code point (col. 4, 11. 15-23, Pintsov states, "Note that the character determined by the selected specialist classifier may be the same character determined as being most probable by the universal classifier system" (emphasis added). This statement indicates that the code point returned my differ from the code point provided to the specialist classifier.

As per claims 17, they recite generally the same limitation as claim 15 except more broadly and analogous remarks apply.

As per claim 24, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claim 25, Pintov teaches:

wherein the recognition information does not correspond to a code point, (col. 3, ll. 48, "probable identity") and wherein the recognition result comprises a single code point (col. 4, ll. 13-20, where the final output is "a" code (singular)).

12. Claims 16, 18, 26 and 27 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Pintsov and Crane as applied to claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claim 18, Pintsov does not teach a specific means to accept a chirograph, however, Crane teaches:

receiving a chirograph (figure 1, elements 12 and 14). Although Crane teaches providing the shape information to a character set discriminator (figure 1, element 16), the examiner is relying upon the teachings of Pintsov to teach the recognition method.

Pintsov teaches:

providing the chirograph (image data, figure 4, element 3) to a primary recognizes (universal recognizer, figure 4, element 8) and receiving recognition information therefrom a primary recognizer for converting chirographs to code points (col. 1, 11. 47-49). determining whether the recognition information corresponds to a recognized result (col.. 4, 11. 11-23) or has a value indicative [of a specialist classifier]. Pintsov teaches that the specialist classifier can be selected based upon any desired criteria including "assignment of a character candidate to by the universal classifier system to a predefined characters groups known to be ambiguous", col. 3, 11. 50-60). The examiner is interpreting this portion of the disclosure to mean that the universal recognizer assigns a character value to the input data, such as an ASCII value for the number "4", his system, then looks at the predefined characters that are part of an ambiguity set, which includes "4" due to its resemblance to "9". Therefore, Pintsov teaches that the specialist recognizer is selected based upon the value returned from the universal classifier.

and without the primary recognizer making a further decision (col. 3, l. 65-col. 4, l. 10).

Pintsov does not specifically teach the use of CART trees as specialist classifiers. Pintsov does, however, teach that the "specialist classifiers may be implemented in any desired fashion

using... algorithms known in the art of character recognition" (col. 3, Il. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches Cart trees are used to solve difficult pattern recognition problems with complex decision or human judgment boundaries (col. 2, second paragraph, p. 183). Guo also teaches that a decision rule is associated with a tree col. 1, second paragraph, p. 184

Pintsov teaches the structure of the following claims and Guo teaches the use of a CART tree:

determining whether the recognition information corresponds to a recognized result or has a value indicative of a CART tree being associated therewith (Pintsov, col. 3, 11. 50-60, Guo, section 4.2);

if the recognition information corresponds to a recognized result, and if the recognition information has the value indicative of the CART tree being associated therewith, providing chirograph information to the CART tree and returning a recognition result wherefrom, the recognition being independent of the value indicative of the CART tree. (Pintsov, col. 4, 11. 4-22, Guo, section 4.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bear on the specific ambiguity class to provide a more accurate result.

As per claim 16, it simply recites the use of a CART tree as a secondary recognizer and the remarks in rejecting claim 18 above apply to those claims. 9.

As per claim 26, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claim 27, Pintov teaches:

wherein the recognition result comprises a single code point (col. 4, ll. 13-20, where the final output is "a" code (singular)).

13. Claims 3-6 and 9 -11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov and Crane as applied to claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claims 3 and 9, Pintsov teaches the "specialist classifiers may be implemented in any desired fashion using... algorithms known in the art of character recognition" (col. 3, 11. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches:

wherein the secondary recognizer is a CART tree. (section 4.2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bring to bear the full power of various feature extraction algorithms known in the art of character recognition to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, col. 3, ll. 30-35) by using a method that improves on

standard classification tree design methods by reducing the number of nodes and having a lower error rate (Guo, abstract)

As per claim 4 and 10, Guo teaches:

training the secondary recognizers by providing a first training set comprising a plurality of chirographs and actual code points for each chirograph (p. 185, sect. 3.1, second paragraph). Guo states that the pattern vectors (actual code points) and their class labels (chirograph) are at a given node. Further in section 4.2 he states that the handwritten character is encoded into pattern vectors.

As per claims 5 and 11, Guo teaches:

wherein training the secondary recognizers further comprises determining a plurality of distinguishing features of the chirographs based on predetermined criteria. Guo teaches that CART trees are grown by recursively finding splitting rules until it cannot be split further (p. 184, sect. 2.1 TREE GROWING. He further teaches in his introduction section, p. 183, that trees classify an input pattern through a chain of decisions. Typically decisions when flow charted are presented in the form of a question (e.g., Does value x exceed threshold b?).

As per claim 6, Guo teaches:

wherein the predetermined criteria correspond to questions, and wherein training the secondary recognizers further comprises determining a question ordering by measuring the quality of each question. (p. 185, sect. 3.1 TREE GROWING, last paragraph of col. 1 and first part of col. 2.) Guo teaches that two different criteria are optimized to find a "good split", it is obvious in the use of CART trees that a quality question would result in a "good split".

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following U.S. patent(s) refer(s) to two-tiered character classification and recognition systems: Porter, III et al., US 5966460, recites a classifier that calls a secondary classifier if the primary classifier has low confidence in its initial recognition result; Moed, US 5638491, refers to a top-level recognizer that merely has a second set of neural networks corresponding to the approximate recognition of the primary recognizer.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The examiner can normally be reached on Monday-Friday, Maxi-flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

mem
March 4, 2003

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600